Notebook, N-91-12-24

This notebook covers the period December 1891-June 1892. It was used by Joseph W. Harris, primarily for notes regarding routine ore assays and other chemical analyses. Included are entries on solutions nos. 1-960, tested to lower the phosphorous content of iron ore concentrate. The book also contains notes and drawings pertaining to insulation, lubrication, and the inductive capacity of metal stearates, as well as a one-page entry concerning the duplication of phonograph cylinders. Material related to the inductive capacity experiments can be found in Arthur E. Kennelly Notebooks #5 and #6. The front cover is labeled "Analytical & Experimental Notes by Jos. W. Harris." The pages are unnumbered. Approximately 180 pages have been used.

Only the material relating to insulation, lubrication, inductive capacity, and phonograph cylinders has been filmed.

N-91-12-24

Jos. W. Harris
Dec 24th 1891.

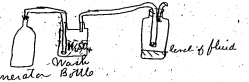
Ash of 13 cm ordinary filter paper, mean of 5 papers

Ash of 13 cm Swedish filter paper, mean of 5 papers.

Ash of 4 inch ordinary filter paper, mean of 5 papers.

Ash of 15 cm ordinary filter paper, mean of 5 papers = 5 milli grams.

Experiment to determine the curve of chlorine absorption of naphthalin, with feeding tube above the surface of the melted mass. thus



Weight of bottle, feeding & exit tubes and 150 grams naphthalin, 549 grams.
Started at 11.10 o'clock the 24th
Weight to be determined each hour.

	Weight.	Gain in Weight
11.10. o'clock	549 grams	
12.00 "	557 "	8 grams.
1.00 "	564 "	7 "
2.00 "	570 "	6 "
3.00 "	576 "	6 "
4.00 "	585 "	9 "
5.00 "	591 "	6 "
6.00 "	593 "	2 "

Started Dec 28th at.

	Weighed.	gains.
11.45	593 gm.	
12.45 "	595½ "	2½ gm.
1.45 "	596½ "	1 "
2.45 "	598 "	1½ "

3.45	598 grams	0 gained

4.00 added 1 3/4 grams crystalized tri chloride of antimony. after it had ceased fuming, at 4.05 o'clock, it weighed 595 1/2 grams.

time	Weight	gain
4.05	595 1/2 grams.	
5.10	601 1/2	6 grams.

Dec 29th 1891

Lubricator Cylinder oiled

9.15	602 1/2	1 "
10.15	607 1/2	5 "
11.00	610	2 1/2 "
12.00	612 1/2	2.5
1.00	614	1.5
2.00	615 1/2	1.5
3.00	616 1/2	1.0
4.00	617 1/2	1.0
5.00	618	0.5

Dec 30th 1891

9.00		
Brought over had gone at 27.0%		
10.00	622	1.0
11.00	623 1/2	3.0
12.00	624 1/2	1.5
1.00	625	1.0
2.00	626	1.5
3.00	627	1.0
4.00	629.5	2.5
5.00	631.5	2.0
6.30	633.0	1.5

(38.5)

Experiments made on the lubricator, Dec. 28th 1891

# 1	Lubricator 3% Paraffin	too soft
# 2	Lubricator 5 % Paraffin	too sift
# 3	Lubricator, 9 % Paraffin,	too sift
# 4	Lubricator 12 % Paraffin	fair
# 5	Lubricator 16 % Paraffin	good
# 6	Lubricator 20 % Paraffin.	Better.

The lubricator is made of 80% Albany grease, and 20% naphthalin. With paraffin, the proportions are

Albany Grease	66.67 %
Naphthalin,	16.67 %
Paraffin,	16.67 %
	100

Dec - 31st - 1891

Generator exhausted during night.

8.45	635 grams	gram
9.00	635 1/4	1/4 "
10.00	635 3/4	1/2 "

Dec. 31st 1891

Experiments on stearates of the metals to determine their specific inductive capacity, for use in high tension condensers.

1

400 grams of commercial stearic acid (from store room) was heated to 300°F and to it, was added, a little at a time, to allow evolution of gas, 16 grams of $PbCO_3$ until it had all combined and the mixture contained stearate of lead and free stearic acid.

2

Same as above, 400 grams stearic acid, and 140 grams $PbCO_3$ Compound is known as "Acid stearate of lead".

Jan 5th 1892.

#3

Same as above, 200 grams Oleic acid, 2.5 grams Cu^2CO_4 (green carbonate). This seems to leave an insoluble residue after all lead combined.

#4.

Same as above, 200 grams Oleic acid 25 grams Cu^2CO_4 (green carbonate) Operation conducted at 275° + gives off gas readily and does not foam.

Jan 5 1892

Same as above, 200 grams $C^{18}H^{36}O^2$ 4.1 grams $FeCO_3$.

6

Same as above, 200 grams $C^{18}H^{36}O^2$ 4.1 grams $FeCO_3$

Analysis of sample marked
21 3rd, for P.
weight for, 100 grams, all treated
digested in a mixture of HNO_3
& HCl, having residual excess
of HNO_2

0.9911

Sp.

1.23 mg.

0.0123% phos

Copper or [illegible]
0.037 % phos

Experiment on the chlorination
of coronula wax for duplicating cylinders
5 bottles of wax, each holding 1 lb.,
labled #1 - #2 #3 #4 #5, one to
have varying quantities of chlorine passed
through, each from a separate generator,
in the proportion of the numbers thus
#1 have 200 grams Hcl, & 50 grams
of MnO_2, #2 have 400 grams Hcl,
& 100 grams Hcl to #5 have 1000 grams
Hcl, & 250 grams MnO_2.

Sp.G. of Hcl 1.175, 8500 = 100 grams

#1 - 50 MnO_2 - 200 Hcl
not very satisfactory

#2 - 100 MnO_2 - 400 Hcl

#3 150 MnO_2 600 Hcl

#4 200 MnO_2 800 Hcl

#5 250 MnO_2 1000 Hcl.

Treatment of Ogden Ore with various substances to oxydize the metallic iron.

The ore to be in 100 gram lots, after treatment, first not if any of the substances, and as lime, alumina, iron, have been dissolved, then filtering water, for different length of time.

1% solutions of various chemicals, such as sodium nitrate, sodium sulphate, sodium chlorate, O from salt and others.

To be in quantities of 10 lbs per ton which is $\frac{1}{224}$ part of the weight used = 0.444 gram per 100 grams of ore.

#1

100 grams ore
100 cc H_2O boiled for 1 hour
0.444 NaCl.

#2

A few clean cast iron filings boiled with tap water.

#3.

100 grams ore
25 cc H_2O
1/4 cc pyrolegnaus acid, = about 5 lbs per ton of ore.

#4

Iron filings, H_2O + NaCl boiled, but not to be boiled dry

#5 Iron filings H_2O + $NaSO_4$ boiled as #4

#6 Iron filings, H_2O_x
pyroligneous acid

#7 - 100 grams roasted
ogden ore, about 50 cc of H_2O.
3 cc HNO_3 to the ton, = about
1/4 of a c.c.

#8 Iron filings,
Epsom Salt,
H_2O

#9

Experiment on deposition of lead plates.

Two samples, Edison Gen. Co & Western Elec Co —

Each piece of lead weighed by Hooper, of the Galvanometer room, & stamped successively 1-20 & 21-40

Twenty different solutions made, with duplicate, (21-40) as below.

1-20 Edison		21-40 Western
1	5%	Solution of Carbolic Acid
2	5%	Creosote
3	5%	Wood tar
4		250 cc. Saturated CO_2 Water
5		250 " " $CaCl_2$ water
6	5%	H_2SO_4
7	5%	Acetic Acid
8	1%	HNO_3
9	5%	Sulphide of Sodium
10	5%	H_2SO_3
11	5%	$NaOH$
12	5%	Na_2SO_4

13	5%	Alum (common)
14		Crudi. Cresoli (concentrated)
15	5%	Hcl
16	5%	Phosphate in Citrate of Na
17	5%	NH_4OH
18	5%	Chloride of Ammonia
19	5%	Na Cl
20	5%	each, Ca SO_4, Fe SO_4 Cresoli
		4 Carbolic acid all mixed in
		200 cc H_2O

	Weights	on	April 14th Wind
1	15.521	21	18.525
2	17.306	22	18.132
3	17.425	23	17.046
4	17.521	24	17.962
5	17.582	25	17.913
6	17.684	26	17.223
7	17.551	27	18.930
8	17.290	28	19.732
9	17.303	29	18.865
10	16.423	30	19.063
11	17.521	31	18.739
12	17.599	32	18.239
13	17.642	33	18.204
14	17.598	34	19.180
15	17.480	35	18.242
16	17.444	36	19.986
17	17.453	37	19.148
18	17.537	38	18.698
19	16.388	39	18.892
20	16.423	40	17.400

Weights of April 20th

	Edam		Mishri
1	15.519	21	18.527
2	17.292	22	18.130
3	17.420	23	17.040
4	17.520	24	17.964
5	17.575	25	17.714
6	17.612	26	17.230
7	17.512	27	18.905
8	17.210	28	18.838
9	17.301	29	15.568
10	16.419	30	19.064
11	17.503	31	18.726
12	17.602	32	18.246
13	17.638	33	18.206
14	17.562	34	17.182
15	17.446	35	18.214
16	17.431	36	17.980
17	17.442	37	19.150
18	17.533	38	18.701
19	16.390	39	18.894
20	16.423	40	17.400

	April 15th Coined with P.P.S.A.		April 20th after 5 days.
1a	22.785	1a	22.785
2a	21.015	2a	21.005
3a	21.700	3a	21.775
4a	22.435	4a	22.435
5a	21.740	5a	21.740
6a	22.630	6a	22.630
7a	22.810	7a	22.785
8a	25.510	8a	24.785
9a	21.300	9a	21.300
10a	24.940	10a	24.940
11a	25.240	11a	25.220
12a	24.000	12a	24.000
13a	21.600	13a	21.600
14a	21.060	14a	21.060
15a	21.790	15a	21.780
16a	22.065	16a	22.056
17a	24.930	17a	24.930
18a	25.450	18a	25.450
19a	26.600	19a	26.600
20a	25.370	20a	25.370

	April 20th 5 oz. Pure Lead		
21P	13.166		Pure Phenol
22P	13.330		
23P	13.248		Pure Isoamyl Alcohol
24P	13.013		
25P	13.284		Methyl Alcohol
26P	13.212		Isopropyl Alcohol "
	April 25th		May 13th 1892
P21	13.111	21P	13.005
P22	13.298	22P	13.095
P23	13.248	23P	13.242
P24	13.023	24P	13.020
P25	13.180	25P	12.965
P26	13.130	26P	12.965
	April 29th		
21P	13.061		
22P	13.253		
23P	13.248		
24P	13.020		
25P	13.053		
26P	13.063		

Solution	April 18th		Lead
	50% acetic		50% acetic
41	22.955	41	27.370
42	16.535 CO_2 50%	42	25.930 CO_2 50% acetic acid
41a	12.775	41a	26.220
42a	7.640 CO_2	42a	29.120 CO_2
	April 21st		
41	22.941	41	27.350
42	16.531	42	25.930
41a	12.779	41a	26.220
42a	7.634	42a	29.120
Solution	April 25		Lead
41	22.927	41	27.323
42	16.530	42	25.929
41a	12.265	41a	26.785
42a	7.634	42a	29.109
	April 25th		May 4th
100P	15.812 Pure Naphthalene	100	15.812
	April 29th		May 13th
100P	15.813	100	15.812

April 22 - 1945

	Edison		Western Elec.
1	15.522	21	18.579
2	17.266	22	18.125
3	17.412	23	17.038
4	17.521	24	17.962
5	17.587	25	17.915
6	17.689	26	17.231
7	17.424	27	18.870
8	17.145	28	18.623
9	17.304	29	18.869
10	16.910	30	19.062
11	17.492	31	18.908
12	17.606	32	18.747
13	17.640	33	18.206
14	17.522	34	17.183
15	17.438	35	18.210
16	17.432	36	17.980
17	17.449	37	17.952
18	17.531	38	18.707
19	16.383	39	18.894
20	16.455	40	17.401

Pure tone

	April 21st	Number wheel	April 25th
50	0.788	2	.788
51	0.709	3	.711
52	0.802	4	.802
53	0.786	6	.775
54	0.765	7	.727
55	0.786	8	.776
56	0.838	9	.838
57	0.818	10	.819
58	0.760	11	.760
59	0.747	12	.746
60	0.846	13	.845
61	0.771	14	.770
62	0.819	15	.798
63	0.732	16	.731
64	0.789	17	.788
65	0.682	18	.681

.788 before removing defective

Low tumbler with Edison

April 19th Pin load.		April 23. 1932	
	P.		
1 P	12.880	1 P	12.874
2 P	13.320	2 P	13.294
3 P	13.080	3 P	12.990
4 P	13.230	4 P	13.220
5 P	13.210	5 P	13.211
6 P	12.590	6 P	12.886
7 P	13.370	7 P	13.353
8 P	13.090	8 P	13.032
9 P	13.390	9 P	13.326
10 P	13.350	10 P	13.339
11 P	12.840	11 P	12.819
12 P	13.160	12 P	13.157
13 P	13.160 in #13 tube Sample	13 P	13.163
14 P	13.160 in #14 tube Sample	14 P	13.145
15 P	12.780 tube	15 P	12.734
16 P	13.220	16 P	13.213
17 P	12.670	17 P	12.665
18 P	12.960	18 P	12.953
19 P	12.900	19 P	12.895
20 P	13.450	20 P	13.437

April 25th Tag arrived with Sulphur			Solutions made on April 25th of course # 101 put in #1 tube
		P	
1a	22.785	101	18.516 #1
2a	20.991	102	17.710 #2
3a	21.764	103	15.909 #3
4a	22.436	104	18.138 #4
5a	21.735	105	17.792 #5
6a	22.619	106	15.787 #6
7a	22.755	107	17.003 #7
8a	24.590	108	16.568 #8
9a	21.297	109	12.833 #9
10a	24.938	110	16.431 #10
11a	25.191	111	17.405 #11
12a	23.893	112	15.811 #12
13a	21.583	113	13.051 #13
14a	21.059	114	17.286 #14
15a	21.758	115	17.678 #15
16a	22.046	116	16.413 #16
17a	24.922	117	12.676 #17
18a	25.449	118	15.883 #18
19a	26.592	119	17.486 #19
20a	25.368	120	16.692 #20
		121	17.141
		122	18.226
		123	17.058
		124	20.040

Put in Rx 4 oxpne.

April 27th 1932 5:40 AM

	April 26th 1892		
	Edison		Herlam Chab
1	13.523	21	18.530
2	17.237	22	18.122
3	17.401	23	17.030
4	17.520	24	17.964
5	17.584	25	17.914
6	17.689	26	17.231
7	17.448	27	18.838
8	17.085	28	18.783
9	17.302	29	18.868
10	16.406	30	19.062
11	17.474	31	18.686
12	17.604	32	18.248
13	17.639	33	18.209
14	17.489	34	18.181
15	17.435	35	18.215
16	17.430	36	17.979
17	17.448	37	19.151
18	17.523	38	18.699
19	16.392	39	18.893
20	16.421	40	17.378

	April 29th		May 4th 1892
101	18.503	101	18.478
102	17.694	102	17.694
103	15.905	103	15.898
104	18.132	104	18.115
105	17.783	105	17.773
106	15.778	106	15.760
107	17.003	107	16.993
108	16.565	108	16.551
109	12.808	109	12.773
110	16.428	110	16.423
111	17.407	111	17.394
112	15.793	112	15.787
113	13.045	113	13.043

May 2nd 1892
Weights of blocks
Pure lead in

			May 6th 1892
125	16.625	125	16.617
126	16.425	126	16.425
127	16.604	127	16.604
128	16.575	128	16.546

Ok 5.30 PM.

	Pure		Lines
	April 29th		May 4th 1900
50	0.789	50	788
51	710	51	709
52	803	52	803
53	766	53	758
54	721	54	714
55	770	55	759
56	836	56	832
57	818	57	818
58	757	58	758
59	746	59	745
60	845	60	845
61	770	61	770
62	776	62	581
63	732	63	731
64	789	64	788
65	681	65	679

	Weights of lead		May 4th
	Pure		
129	16.500	129	16.500
130	16.720	130	16.720
131	16.670	131	16.670
132	16.480	132	16.480
133	16.745	133	16.745
134	16.745	134	16.745
135	16.740		
136	16.740		May 9th 1902
137	16.595	129	16.446
138	16.720	130	16.664
139	16.840	131	16.608
140	16.645	132	16.474
141	16.690	133	16.732
142	16.700	134	16.738
143	16.760		
144	16.665		
145	16.690		
146	16.000		
147	16.032		

Lines made May 2nd

Affidavit May 2

1/-30 Mich.

	Edison May 4th		Nerlin May 4th
1	15.534	21	18.530
2	17.226	22	18.116
3	17.391	23	17.027
4	17.521	24	17.962
5	17.584	25	17.914
6	17.290	26	17.231
7	17.399	27	18.790
8	16.975	28	18.824
9	17.304	29	18.868
10	16.407	30	19.055
11	17.470	31	18.656
12	17.606	32	18.247
13	17.642	33	18.210
14	17.455	34	19.182
15	17.437	35	18.217
16	17.429	36	17.977
17	17.449	37	19.151
18	17.516	38	18.691
19	16.393	39	18.892
20	16.420	40	17.394

	May 4th 1892		May 10th 1892 at 4½ o'clock
114	17.284		
115	17.674	129 p	16.500
116	16.363	130 p	16.720
117	12.348	131 p	16.670
118	15.883	132 p	16.480
119	17.468	133 p	16.745
120	16.679	134 p	16.745
121	17.156	135 p	16.740
122	18.225	136 p	16.740
123	17.040	137 p	16.595
124	20.013	138 p	16.720
		139 p	16.840
	Nerlin	140 p	16.645
	Clean Cathode	141 p	16.690
		142 p	16.700
	May 9th	143 p	16.760

		Tuesday		
150°	15.807	129	144 p	16.665
151°	16.072	130	145 p	16.690
152°	15.461	131		May 11th at 11 o'clock
	May 10th	132	146 p	16.700
150°	15.795		147	16.032
151°	16.068			
152°	15.461			

	May 16th		May 12th
148	16.360	1 P	12 877
149	16.178	2 P	13 200
150	16.128	3 P	12 950
151	16.121	4 P	13 220
152	15.860	5 P	13 210
153	15.883	6 P	12 885
154	16.599	7 P	13 305
	May 20th	8 P	12 965
148	16 355	9 P	13 325
149	16 172	10 P	13 343
150	16 128	11 P	12 790
151	16 121	12 P	13 160
152	15 861	13 P	13 172
153	15 884	14 P	13 127
154	16 461	15 P	12 680
		16 P	13 210
		17 P	12 665
		18 P	12 955
		19 P	12 890
		20 P	13 435

	May 12th		May 13th
41	22 785	41	Solids 22.872
42	20 955	42	16.525
43	21 745	42a	12.167
44	22 435	42a	7.630
45	21 735		Lead
46	22 620	41	27.320
47	22 647	42	25.920
48	24 902	42a	26.585
49	21 300	42a	29 695
50	24 940		
51	25 100		
52	23 995		
53	21 587		
54	21 050		
55	21 750		
56	22 040		
57	24 925		
58	25 427		
59	26 585		
60	25 365		

	May 13th 1942		May 14th
101 p	18.432	135	16 737
102 p	17.630	136	16 740
103 p	15.890	137	16 585
104	18.095	138	16 690
105	17.765	139	16 825
106	15.735	140	16.647
107	16.970	141	16 670
108	16.535	142	16 675
109	12.702	143	16 755
110	16.412	144	16 660
111	19.352	145	16 685
112	15.280	146	15 795
113	13.020	147	16 045
114	17.920		May 15th
115	17.670	135 p	16 726
116	16.310	136	16 735
117	12.650	137	16 569
118	15.850	138	16 641
119	17.465	139	16 810
120	16.680	140	16 645
121	17.130	141	16 645
122	18.230	142	16 642
123	17.020	143	16 745
124	18.995	144	16 648
		145	15 945
		146	16 034

	May 20th		May 21st 1942
115	16 617	135	16.723
116	16.426	136	16.733
117	16.604	137	16.559
118	16 481	138	16.620
119	16.378	139	16.804
130	16 593	140	16.644
131	16 537	141	16.639
132	16 462	142	16.622
133	16 717	143	16.738
134	16 723	144	16.640
		145	16.622
		146	15.932
		147	16.027

A piece of pure lead was put in a solution of stannous chloride (concentrated) for 1 hour. A coarse deposit of tin was made all over the surface, placed in crucible on April 25th
Weighed on April 25th
12.9416 grams lead, washed, 80.0%
Annealed at 9.15 A.M.
Wt. 12.936 grams.

Assay for a sample of ore received from A. F. Lewis, Fort Bidwell, Modoc Co, Cal, which is supposed to contain platinum.

10 grams Ore,
80 " Granulated lead,
5 " borax.

Contains no platinum.

April 25th

Solutions of coal tar creosote with other substances to neutralize the acids contained to prevent corrosion of lead.

#1	Creosote, small quantity of NaO,	mixed by Mr. Eaton
102 #2	" Larger " "	mixed by Mr. E.
103 #3	Creosote, about 1/20 solution of slaked lime	slaked with minimum water
104 #4	" " " 1/10 " " " " "	
105 #5	" " 1/20 of NaO & 1/40 of H_2O	
106 #6	" & Sodium Carbonate	
107 #7	" & Zinc Chloride	
108 #8	" Barytes -	
109 #9	" Litharge	
110 #10	" Common salt	
111 #11	" Iron filings (cast iron)	
112 #12	" heated with water, which dissolved some creosote	
113 #13	Water from #12 contains creosote	

April 26th -

Reading		
114	114	Acetone Conc
115	115	Ortho-Cresol Conc
116	116	Meta Cresol "
117	117	Meta Xylenol "
118	118	Alpha Naphtol in $CHCl_3$
119	119	Beta Naphtol " "
120	120	Boracic Acid in H_2O
121	121	H_2S Water Conc
122	122	Ammonium Sulphide Conc
123	123	" Sulpho Cyanide Conc
124	124	Ammonium Chloride Conc
125	125	Aniline Oil conc
126	126	Pyridine conc
127	127	tap Water
128	128	Beech Wood Tar Creosote

May 4th 1892.

Solutions of Creosote, + Creosote prepared with salt, to confirm results of #110 of April 25th

129	Pure Coal tar Creosote
130	" " " "
131	" " " "
132	" " " " salt
133	" " " " treated with
134	" " " " "

May 10th 1892

135	Creosote treated with	$CaCl_2$
136	" " "	Na_2SO_4
137		$NaNO_3$
138		Sodium silicate
139		$MgSO_4$
140		10% H_2SO_4 & H_2O
141		$NHSO_4$
142		Na_2CO_3
143		Resin
144		Fe_2O_3
145		$Fe\ SO_4$
146		MnO_2
147		$SnCl_2$

May 10th 1892 at 4.15

May 16th 1892

148	Creosote &	$CaCl_2$
149	"	" " "
150	"	Na_2SO_4
151	"	" "
152	"	H_2SO_4 10%
153	"	" " "
154	"	NH_4OH

Exp. The distillation of fusel oil, for amylene.

Ordinary fusel oil was mixed with chloride of zinc & caustic potash to absorb moisture, and distilled at a temp of 130°C. (266°F.)

A yellow fluid came over which on test did not act like amylene, only treated once, and had an oily nature.

The same mixture was distilled at a lower temperature and a colorless aromatic fluid came over the vapors of which attacked the cork, and broke it.

At a higher temperature a yellow oily fluid came over of an oily nature which unlocked a lamp like amylene, but not nearly so well. It only treated once on the pump.